

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1-6. (Canceled)

7. (Allowed) A method of cleaning a semiconductor processing equipment, said method comprising:

introducing a first precursor to a dissociator;

dissociating said first precursor to create a first plurality of radicals;

introducing a first portion of said first plurality of radicals to said equipment, a second portion of said first plurality of radicals re-associating to create less reactive elements;

introducing said less reactive elements to said equipment;

dissociating said less reactive elements to form a second plurality of radicals in said equipment;

introducing a second precursor comprising oxygen into said equipment, wherein said second precursor bypasses said dissociator; and

using the first and second portions of the first plurality of radicals and constituents of the second precursor to clean the equipment, wherein the oxygen combines with carbon on the equipment to form CO<sub>y</sub>.

8. (Allowed) The method of claim 7, wherein said dissociating said first precursor provides at least 75% dissociation efficiency, whereby PFCs in an exhaust from said system equipment are reduced.

9. (Allowed) The method of claim 7, wherein said second portion of said first plurality of radicals is greater than said first portion of said first plurality of radicals.

10. (Allowed) The method of claim 9, wherein said first precursor comprises a fluorinated species capable of supplying atomic fluorine.

11. (Allowed) The method of claim 7, wherein said second plurality of radicals includes cleaning ions.

12. (Allowed) The method of claim 11, wherein said cleaning ions include at least one of F ions or Cl ions.

13. (Allowed) The method of claim 7, wherein said dissociating said less reactive elements creates physical sputtering.

14. (Allowed) The method of claim 7, wherein said less reactive elements include at least one of F<sub>2</sub> or Cl<sub>2</sub>.

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Currently amended) The method of claim 7 ~~18~~, wherein said dissociating said first precursor includes forming a first plasma and said dissociating said less reactive elements includes forming a second plasma.

21. (Currently amended) A semiconductor equipment cleaning system comprising:  
a housing;

a remote dissociator configured to dissociate a first gas remote from said housing, said dissociation forming a second gas, ~~and to dissociate a third gas remote from the housing;~~

a gas delivery system to introduce a portion of said first gas, a portion of said second gas, a ~~portion of the third gas~~ comprising oxygen, and a re-associated portion of said second gas into said housing, the third gas bypassing the dissociator;[.]

a local dissociator configured to dissociate said re-associated portion of said second gas;

a controller for controlling said remote dissociator, said gas delivery system, and said local dissociator; and

a memory coupled to said controller, said memory comprising a computer-readable medium having a computer-readable program embodied therein for directing operation of said semiconductor cleaning system, said computer-readable program comprising:

instructions directing said remote dissociator to dissociate said first gas ~~and the third gas;~~

an instruction to control said gas delivery system; and

an instruction directing said local dissociator and said remote dissociator to dissociate a re-associated portion of said second gas.

22. (Canceled)

23. (Canceled)

24. (Canceled)

25. (Currently amended) A method for cleaning a deposition chamber, the method comprising:

delivering a first precursor gas and a second precursor gas into a remote dissociator;

dissociating at least part of the first precursor gas in the remote dissociator, wherein a first plurality of radicals are formed;

dissociating at least part of the second precursor gas in the remote dissociator,  
wherein a second plurality of radicals are formed that are different from the first plurality of  
radicals;

flowing a first portion of the first plurality of radicals into the deposition chamber,  
wherein the first portion of the first plurality of radicals react to clean the deposition chamber;

flowing a second portion of the first plurality of radicals into the deposition  
chamber, wherein the second portion includes radicals associated to form less reactive elements;

flowing a portion of the second plurality of radicals into the deposition chamber,  
wherein the portion of the second plurality of radicals react to clean the deposition chamber; and

dissociating at least part of the less reactive elements in the deposition chamber,  
wherein the dissociated less reactive elements react to clean the deposition chamber;

~~The method of claim 23,~~ wherein the first precursor gas comprises fluorine, and  
the second precursor gas comprises chlorine.

26. (Currently amended) A method for cleaning a deposition chamber, the  
method comprising:

delivering a first precursor gas and a second precursor gas into a remote  
dissociator;

dissociating at least part of the first precursor gas in the remote dissociator,  
wherein a first plurality of radicals are formed;

dissociating at least part of the second precursor gas in the remote dissociator,  
wherein a second plurality of radicals are formed that are different from the first plurality of  
radicals;

flowing a first portion of the first plurality of radicals into the deposition chamber,  
wherein the first portion of the first plurality of radicals react to clean the deposition chamber;

flowing a second portion of the first plurality of radicals into the deposition  
chamber, wherein the second portion includes radicals associated to form less reactive elements;

flowing a portion of the second plurality of radicals into the deposition chamber,  
wherein the portion of the second plurality of radicals react to clean the deposition chamber; and

dissociating at least part of the less reactive elements in the deposition chamber,  
wherein the dissociated less reactive elements react to clean the deposition chamber;

~~The method of claim 23,~~ wherein dissociating at least part of the less reactive elements in the deposition chamber is performed prior to flowing a portion of the second plurality of radicals into the deposition chamber, and wherein dissociating the second precursor gas is performed exclusively in the remote dissociator.

27. (Currently amended) A method for cleaning a deposition chamber, the method comprising:

delivering a first precursor gas and a second precursor gas into a remote dissociator;

dissociating at least part of the first precursor gas in the remote dissociator,  
wherein a first plurality of radicals are formed;

dissociating at least part of the second precursor gas in the remote dissociator,  
wherein a second plurality of radicals are formed that are different from the first plurality of radicals;

flowing a first portion of the first plurality of radicals into the deposition chamber,  
wherein the first portion of the first plurality of radicals react to clean the deposition chamber;

flowing a second portion of the first plurality of radicals into the deposition chamber, wherein the second portion includes radicals associated to form less reactive elements;

flowing a portion of the second plurality of radicals into the deposition chamber,  
wherein the portion of the second plurality of radicals react to clean the deposition chamber; and

dissociating at least part of the less reactive elements in the deposition chamber,  
wherein the dissociated less reactive elements react to clean the deposition chamber;

~~The method of claim 23,~~ wherein dissociating at least part of the less reactive elements in the deposition chamber is performed after flowing a portion of the second plurality of radicals into the deposition chamber[.] .

28. (Allowed) A method for cleaning a deposition chamber contaminated with carbon and silicon based contaminants, the method comprising:
- delivering  $\text{NF}_3$  gas into a remote dissociator;
  - dissociating at least part of the  $\text{NF}_3$  gas in the remote dissociator, wherein fluorine radicals are formed;
  - flowing a first portion of the fluorine radicals into the deposition chamber;
  - flowing a second portion of the fluorine radicals into the deposition chamber, wherein the second portion includes fluorine radicals associated to form less reactive elements;
  - dissociating at least part of the less reactive elements in the deposition chamber to form additional fluorine radicals, wherein the fluorine radicals react with the silicon based contaminants on the deposition chamber; and
  - flowing oxygen into the deposition chamber, wherein the oxygen reacts with the carbon based elements in the chamber;
  - wherein the silicon and carbon based contaminants comprise a  $\text{BLO}_K$  residue.
29. (Canceled)
30. (Allowed) The method of claim 28, wherein the  $\text{BLO}_K$  residue reacts with the fluorine radicals to form  $\text{SiF}_x$ , and with the oxygen to create  $\text{CO}_y$ .
31. (Allowed) The method of claim 28, wherein the oxygen is at least partially dissociated to create oxygen radicals.
32. (Allowed) The method of claim 28, wherein the carbon and silicon based contaminants are residue from deposition of an SiC material performed in the deposition chamber during a preceding deposition process.
33. (Currently amended) A computer-readable storage medium having a computer-readable program embodied therein for directing operation of a semiconductor cleaning system, said semiconductor cleaning system comprising an equipment, a remote

dissociator, a local dissociator, and a gas delivery system configured to introduce a gas from said remote dissociator into said equipment, said computer-readable program including instructions for operating said semiconductor cleaning system in accordance with the following:

delivering a first precursor gas comprising fluorine and a second precursor gas comprising chlorine into the remote dissociator;

dissociating at least part of the first precursor gas in the remote dissociator to form a first plurality of radicals;

dissociating at least part of the second precursor gas in the remote dissociator to form a second plurality of radicals different from the first plurality of radicals, the first and second plurality of radicals adapted for reacting with different chemical compounds on the equipment; and

dissociating less reactive elements in the local dissociator, wherein the less reactive elements are formed from a portion of the first plurality of radicals that combine in the gas delivery system.